

No. 897,951.

PATENTED SEPT. 8, 1908.

C. S. YARNELL.  
RUBBING AND POLISHING MACHINE.

APPLICATION FILED MAY 1, 1905.

4 SHEETS—SHEET 1.

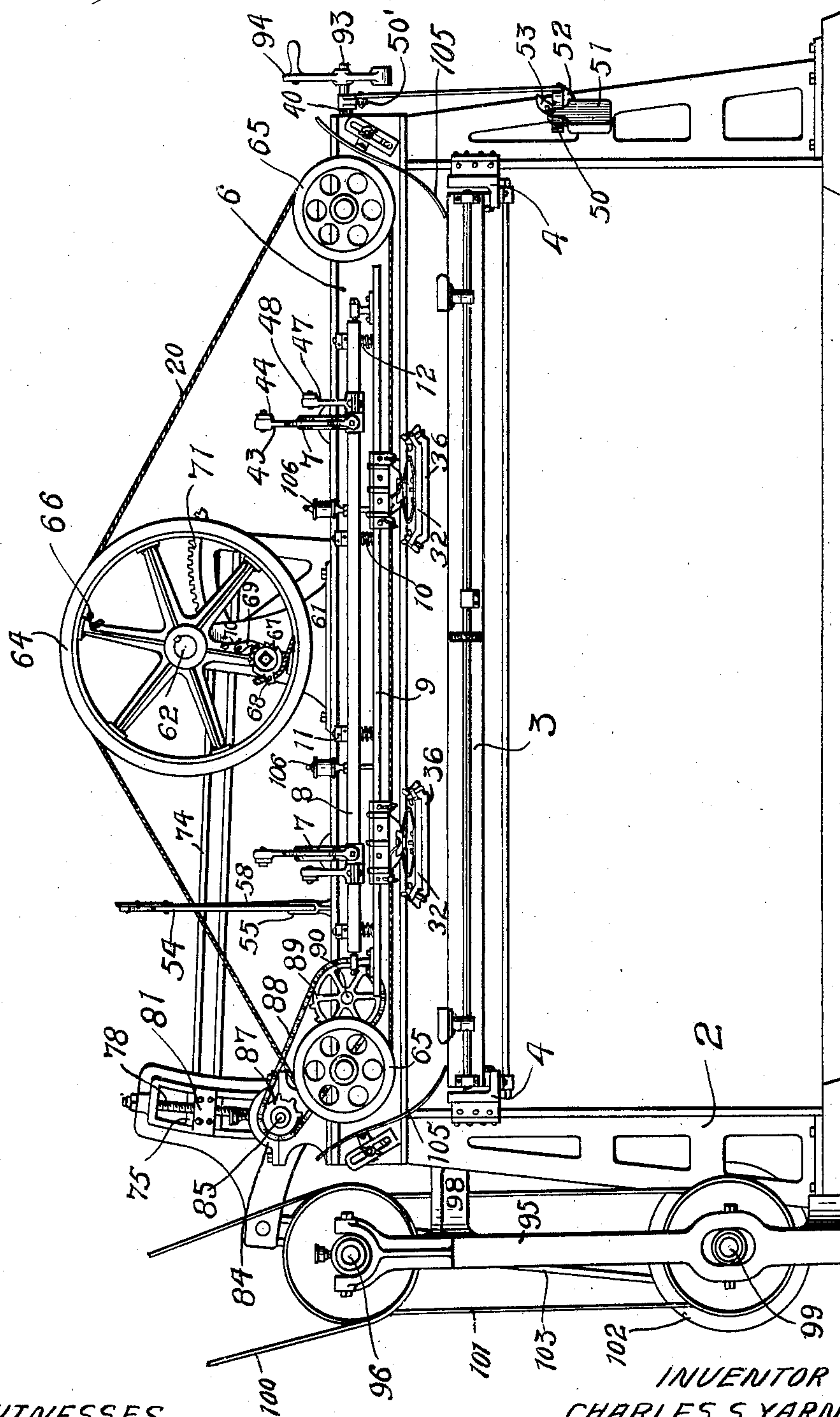


Fig. 1.

WITNESSES.  
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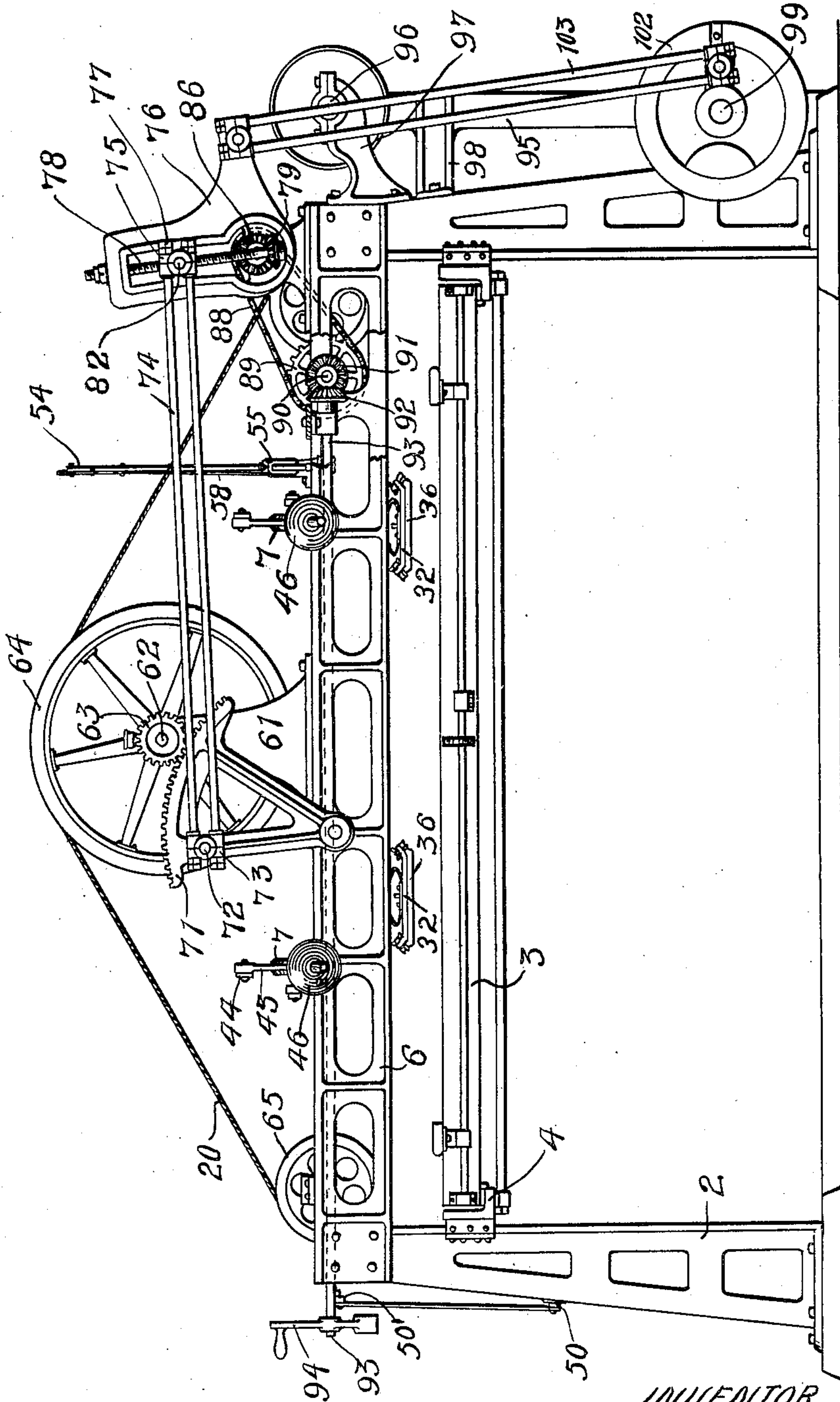


Fig. 2.

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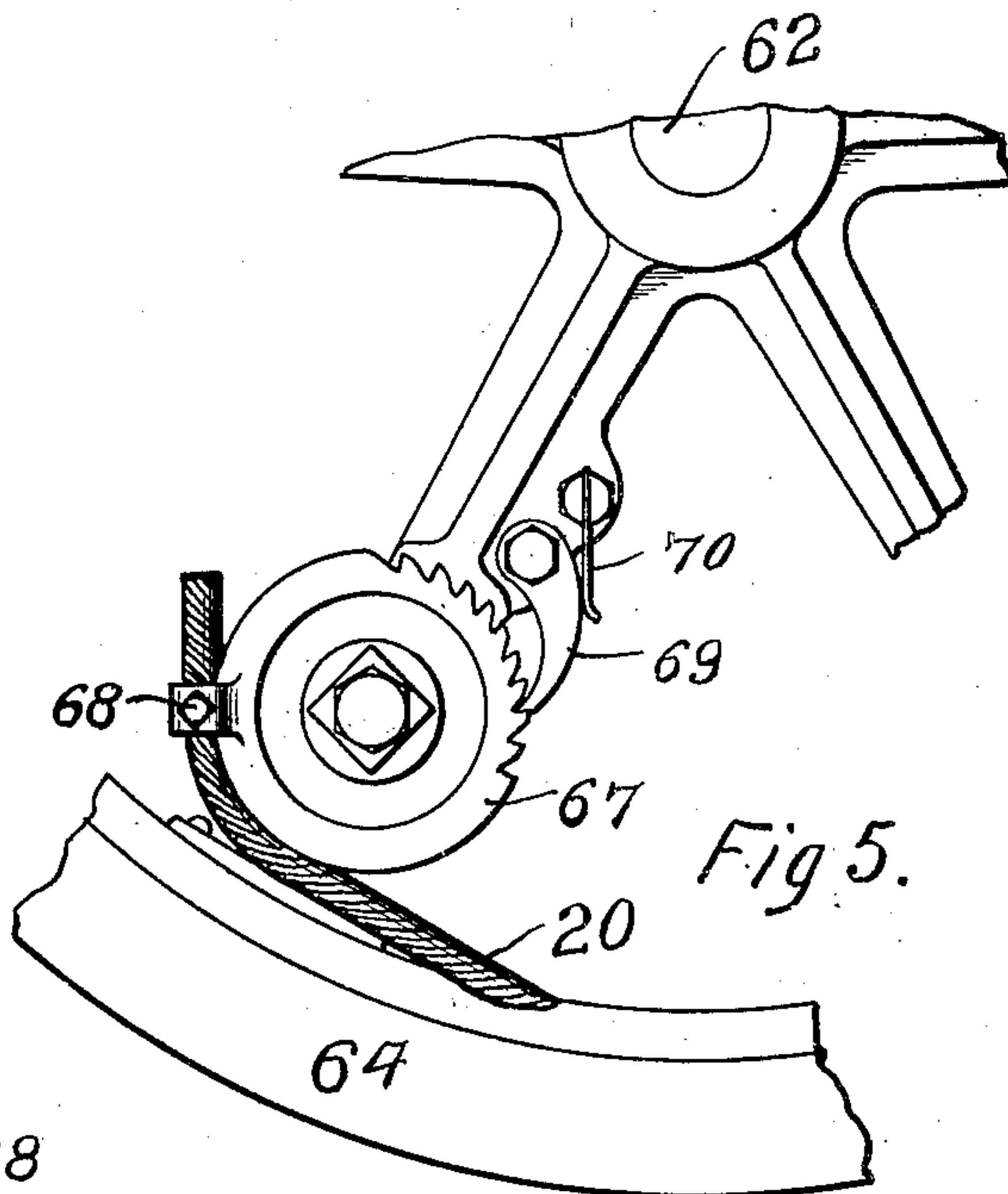
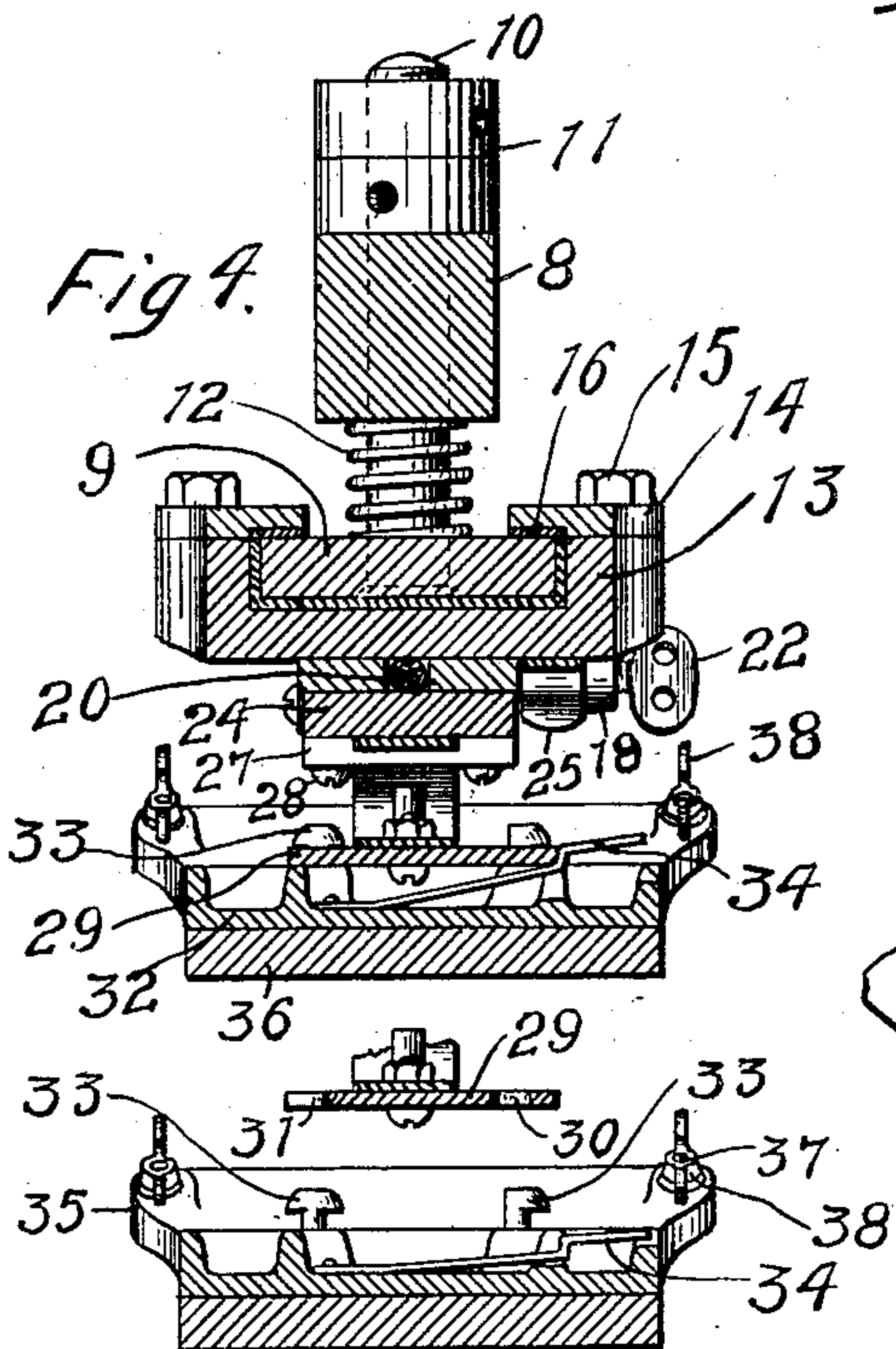
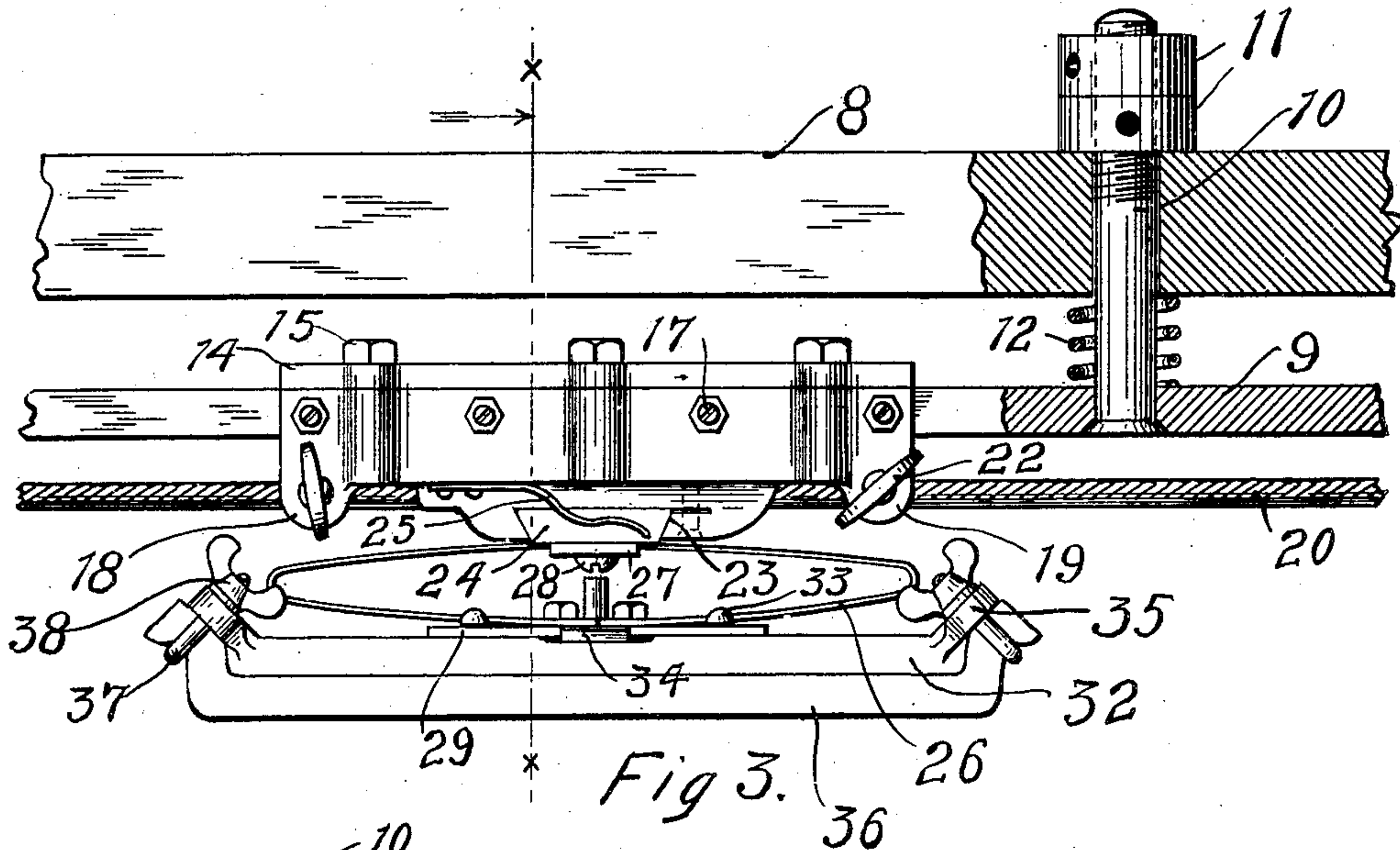
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4 SHEETS—SHEET 3.



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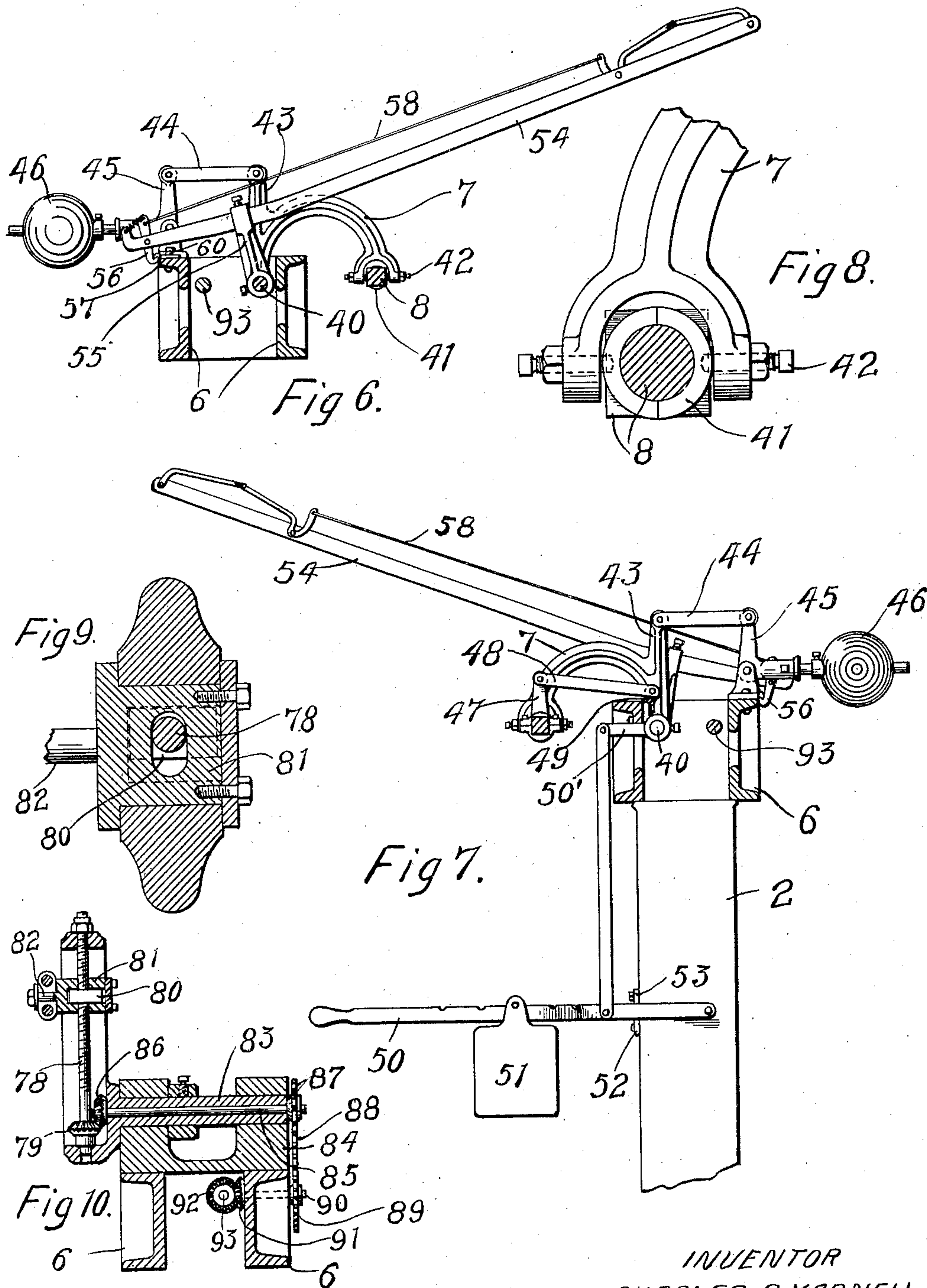
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

CHARLES S. YARNELL, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MOORE CARVING MACHINE CO., OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

## RUBBING AND POLISHING MACHINE.

No. 897,951.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed May 1, 1905. Serial No. 258,203.

*To all whom it may concern:*

Be it known that I, CHARLES S. YARNELL, of Minneapolis, in the county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Rubbing and Polishing Machines, of which the following is a specification.

This invention relates to improvements in rubbing and polishing machines in which the work is done by a reciprocating rubbing head adapted to operate upon the plane or uneven surfaces of wood, stone or metal on which it is desired to use any of the various rubbing, abrading or polishing materials.

The object of my invention is to provide a machine having a vertically movable pressure-bar and one or more reciprocating rubbing heads arranged to reciprocate upon a guide-bar secured to said pressure-bar, whereby as said pressure-bar is depressed, the reciprocating rubbing heads are brought with yielding pressure onto the surface of the article to be operated upon.

Another object of the invention is to provide means for readily changing the stroke or length of movement of the rubbing heads.

Another object of the invention is to provide means for readily detaching or removing the rubbing heads.

Other objects of the invention will appear from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a front elevation of a rubbing and polishing machine embodying my invention. Fig. 2 is a rear elevation of the same. Fig. 3 is a detail elevation of one of the rubbing heads and portions of the pressure-bar and guide-bar. Fig. 4 is a section on line  $x-x$  of Fig. 3. Fig. 5 is a detail of the means for tightening the cable. Figs. 6 and 7 are elevations of the means for operating the pressure-bar. Fig. 8 is a detail of the pressure-bar and yoke supporting the same. Figs. 9 and 10 are details of portions of the stroke controller.

In the drawings, 2 represents the frame of the machine which may be of any suitable or preferred construction. This frame carries the horizontal rails or ways 4 upon which is supported the work-table 3. This table may be moved forward and back to carry the article to be operated upon, beneath the reciprocating rubbing heads.

The frame of the machine, the work-sup-

porting table, and the means for operating the same are preferably substantially the same as the corresponding parts shown and described in Letters Patent of the United States No. 743608 issued to me November 10, 1903 and in Letters Patent No. 761023 issued to me May 24, 1904.

Secured upon the standards 2 are the horizontal bars or beams 6, which are suitably secured at their ends to the upper portions of said standards. Said beams are thus separated a distance substantially equal to the width of the upper end of each standard. Mounted upon the beams 6 is an oscillating shaft 40 that supports the curved levers 7 which project over the forward beam and which support the horizontal pressure-bar 8, and arranged below and supported upon the bar 8, is a horizontal guide-bar 9. This bar is provided with a series of studs 10 which project through the bar 8 and have, upon their screw-threaded upper ends, suitable nuts 11, by means of which the pressure upon the rubbing heads may be regulated. Supported upon the guide-bar 9 and capable of reciprocating freely thereon, I provide one or more reciprocating rubbing heads. I have shown in the drawings two of such rubbing heads and prefer to use this number, but it is obvious that a single rubbing head or more than two such heads can be used without departing from my invention.

The construction of the rubbing heads that I prefer to employ is shown in the drawings (see Figs. 3 and 4). As herein shown, a block 13 having a groove to fit the bar 9, is provided with plates 14 secured in position by screws 15, the edges of said plates lapping over the top of the bar 9 and holding the block in position thereon. A lining 16 of hard fiber, or other suitable material, is arranged in the groove in said block, and a series of adjusting screws 17 bearing against this fiber extend through the front of the block. This block is provided also with the depending slotted lugs 18 and 19 through which slots the operating cable 20 extends. Suitable screws 22 are arranged in the lugs and, by means of these screws, the block may be clamped to the cable so as to cause the block or blocks to move with said cable. The lower part of the block is provided with a dove-tailed recess 23 extending transversely of the block and in this recess a dove-tailed block 24 is fitted, being held in position by a spring catch 25.



A flat oval spring 26 is secured to the under-  
side of the block 24, preferably by means of  
the plate 27 and screws 28. This spring is  
preferably formed of a single strip of steel  
bent into form and with the two ends held in  
position by the plate 27. To the bottom of  
the spring I secure a plate 29 having slots 30  
and 31. The rubbing block 32 is secured to  
this plate by means of the studs 33 which are  
adapted to be fitted into said slots and  
brought into the position shown in Fig. 4  
with the heads of the studs engaging the sur-  
face of the plate 29. The block is locked in  
this position by a spring catch 34. The  
block 32 is provided with the upturned ends  
35 and a sheet of felt 36, or other suitable  
rubbing material, is carried across the lower  
face of said block and its ends secured to the  
upturned ends of the block by means of the  
clamping bars 37 and the thumb-nuts 38.

For the purpose of changing the rubbing  
material, the block 32 may be readily re-  
moved from the plate 29 by first releasing the  
catch 34. When it is desired to remove the  
block 24, the spring catch 25 is forced up-  
ward and the block drawn out of the recess 23.  
This construction provides a rubbing block  
that is held upon the surface of the work by  
spring pressure and the flexible guide-bar 9  
permits of the application of a perfectly uni-  
form pressure to all parts of the surface being  
rubbed, whether said surface is level or other-  
wise and insures a uniform finish throughout.

The levers 7 are secured upon the shaft 40,  
which is preferably secured in suitable bear-  
ings upon the rear side of one of the beams  
6. The forward ends of the levers 7 are  
forked and the pressure-bar 8 is cylindrical at  
a point within each of said forks. A two-  
piece collar 41 is arranged upon this cylin-  
drical part of the bar and is held in position  
by screws 42 passing through the arms of the  
fork. This construction permits the collars  
to turn on said bar as the forward ends of the  
levers are raised and lowered. Each of said  
levers is provided with a projecting arm 43  
connected by a link 44 to a bell crank-lever 45  
carrying a counterweight 46.

For the purpose of preventing the bar 8  
from turning with the collars 41, a lug 47 is  
secured to said bar and projects vertically  
therefrom and the upper end of this lug is  
connected by a link 48 with a stationary lug  
49 secured upon the bearing block of the  
shaft 40. The horizontal guide-bar 9 is pref-  
erably formed of a thin flat bar of steel and  
possesses considerable flexibility, and the  
use of this bar permits the application of a  
perfectly uniform pressure to all parts of the  
surface being rubbed, whether said surface is  
level or otherwise and insures a uniform fin-  
ish throughout, and it permits the successful  
rubbing of warped or twisted surfaces without  
cutting through the varnish.

The end of the shaft 40 is provided with a

forwardly projecting arm 50' connected to a  
lever 50 carrying a sliding pressure weight 51.  
This weight may be set so as to apply any de-  
sired amount of pressure to the surface being  
operated upon. I also prefer to provide in  
connection with the lever 50 a lug 52 secured  
upon the frame of the machine onto which  
this lever may be moved so as to hold the  
pressure-bar and blocks in an elevated posi-  
tion. A pivoted button 53 is provided in  
connection with this lug and when this but-  
ton is turned over so as to bring its end  
against the lever 50, said lever is prevented  
from resting upon said lug.

In some classes of work, it is desirable for  
the operator to stand near the end of the ma-  
chine. In this instance he will control the  
pressure on the rubbing heads by means of  
the lever 50. For the purpose, however, of  
permitting the control of these heads by an  
operator standing in front of the machine, I  
provide the operating lever 54 connected to  
the shaft 40 by means of a lug 55 and carry-  
ing at its rear end a pivoted latch 56 adapted  
to engage a projection 57 on the rear beam 6.  
A cord or wire 58 extends from the upper end  
of the latch 56 to the forward end of the lever  
54. When the rubbing heads are raised, the  
latch 56 engages the projection 57 and holds  
them in this position. When it is desired to  
press these heads upon the surface to be op-  
erated upon, the latch is released and the de-  
sired pressure is exerted on the heads by the  
weight on the lever 50. When it is desired  
to control the rubbing heads by means of the  
lever 50, the projection 57 may be turned  
around, being held in position by a single  
screw or bolt 60 so that its end will be out of  
position to be engaged by the latch 56.

I provide means for reciprocating the  
rubbing heads and also provide an adjust-  
able stroke controller, these parts being pref-  
erably constructed and arranged as follows:  
Mounted in a standard 61 upon the frame of  
the machine is a shaft 62 carrying at one end  
a pinion 63 and at the other end a sheave 64.  
The cable 20, to which the reciprocating  
blocks are clamped, extends around the idler  
sheaves 65 mounted upon studs on the frame  
of the machine near each end thereof and  
this cable is carried around said sheave 64.  
One end of the cable is secured to the rim of  
this sheave by a clamping screw 66 and the  
other end passes through an opening in the  
rim of the sheave and is secured to a ratchet  
wheel 67 by means of a clamping screw 68.  
A ratchet 69 upon the arm of the sheave en-  
gages the teeth of ratchet wheel 67, being  
held in position by a spring 70. By means  
of this ratchet the cable can be tightened and  
all slack taken out of it. Pivoted upon the  
frame of the machine is a gear sector 71, the  
teeth of which engage the pinion 63 upon the  
rear end of the shaft 62. This sector is pro-  
vided with a connecting pin 72. A block 73



is arranged upon the pin 72 and a connecting rod 74 extends from this block to a similar block 75 upon a bell-crank operating lever 76. Each of the blocks 73 and 75 is preferably made in two parts and these blocks are connected by two rods having threaded ends passing through said blocks and secured therein by means of suitable lock nuts 77. One arm of the bell-crank-lever 76 is provided with an open slot in which is arranged a threaded shaft 78. This shaft is mounted in bearings at the ends of the slot and carries, at one end, a miter gear 79. The threaded part of the shaft 78 passes through a nut 80 arranged in a block 81 carrying a pin or stud 82 that is engaged by the two-part block 75. The threaded shaft 78 passes through slots in the block 81 above and below the nut 80 and the opening in said block is of sufficient size to permit a sliding movement of said nut in the block as the nut is moved up and down on the shaft. The pivot of the bell-crank-lever 76 is formed by a short shaft 83 mounted in bearings 84 upon the frame of the machine. This shaft is hollow and a smaller shaft 85 extends through it, being provided at one end with a miter gear 86 that meshes with the miter gear 79 on the shaft 78 and at its other end with a suitable sprocket pinion 87. The pinion 87 is engaged by a sprocket chain 88 that passes around a sprocket wheel 89 secured upon a shaft 90 mounted in the frame of the machine. This shaft is provided with a miter gear 91 that engages a similar gear 92 upon a shaft 93 extending lengthwise of the machine between the two beams 6 and provided at its end with an operating handle 94. Secured to the end of the machine is a standard 95 in which one end of the driving shaft 96 is mounted. The opposite end of this shaft is mounted upon a bracket 97 secured on the end of the machine frame. The standard 95 has an arm 98 bolted to the end of the frame and to this standard, and a counter-shaft 99 is mounted in the lower part of this standard and on a suitable bracket secured upon the machine frame. This counter-shaft carries a series of pulleys of different diameters and a corresponding series of pulleys are secured upon the shaft 96. The shaft 96 is also provided with the usual fast and loose pulleys for receiving a driving belt 100 and a suitable belt 101 extends between the pulleys upon the shafts 96 and 99. The shaft 99 also carries a crank disk 102 and a connecting rod 103 extends from the crank pin on this disk to a crank pin on one arm of the bell-crank-lever 76. By this means, as the shaft 99 is rotated and the bell-crank-lever 76 is oscillated, an oscillatory motion is communicated to the pivoted sector 71. An oscillatory movement is thereby communicated to the shaft 62 and, through the cable 20, the rubbing heads are

reciprocated upon the guide-bar 9. Through the lever 50 or the lever 54, the operator has complete control of the rubbing heads. The length of stroke of said blocks may be controlled through the handle 94 and the mechanism operated thereby.

The felt holding plates may be quickly removed and readily changed, permitting a rapid change from oil to water rubbing. The length of stroke of the heads may be changed so as to suit the outlines of any surface to be operated upon without stopping the machine or interfering with the progress of the work. Two or more round, oval or irregular shaped tops for tables, or other articles, can be rubbed at one time without the aid of forms, plates, or blocks of any kind.

Adjustable shields 105 are preferably arranged at each end of the table for the purpose of catching the oil or water thrown off from the surface being operated upon by the blocks and returning it to the table.

Suitable oil cups 106 are provided for lubricating the flexible guide-bar and the bearings of the machine.

I claim as my invention:

1. The combination, with a suitable work supporting table, of a flexible guide-bar, a reciprocating rubbing head arranged upon said guide-bar, means for reciprocating said head, and means for raising and lowering said guide-bar.

2. The combination, with a suitable work-supporting table, of a vertically movable pressure-bar, a guide-bar arranged below and parallel with said pressure-bar, a reciprocating rubbing head arranged upon said guide-bar, means for raising and lowering said pressure-bar, and means for reciprocating said head.

3. The combination, with a suitable work supporting table, of a vertically movable pressure-bar, a flexible guide-bar arranged below and parallel with said pressure-bar, a reciprocating rubbing head arranged upon said guide-bar, means for raising and lowering said pressure-bar, and means for reciprocating said head.

4. The combination, with a suitable work supporting table, of a vertically movable pressure-bar, a guide-bar arranged below and parallel with said pressure-bar, yielding means connecting said guide-bar with said pressure-bar, a reciprocating rubbing head arranged upon said guide-bar, means for raising and lowering said pressure-bar, and means for reciprocating said head.

5. The combination, with a suitable work supporting table, of a pressure-bar, levers supporting said bar, a rotatable shaft to which said levers are secured, a guide-bar arranged below and parallel with said pressure-bar, yielding means connecting said guide-bar with said pressure-bar, a reciprocating



cating rubbing head arranged upon said guide-bar, and means for reciprocating said head.

6. The combination, with a suitable work  
5 supporting table, of a vertically movable pressure-bar, a flexible guide-bar supported below and parallel with said pressure-bar, yielding means connecting said guide-bar and said pressure-bar, a reciprocating rub-  
10 bing head mounted upon said guide-bar, means for reciprocating said head, and an adjustable stroke controller for regulating the stroke of said head.

7. The combination, with a suitable work

supporting table, of a vertically movable 15 pressure-bar, a guide-bar arranged below and parallel with said pressure-bar, a reciprocating rubbing head arranged upon said guide-bar, means for raising and lowering said pressure-bar, means for reciprocating said 20 head, and an adjustable stroke controller controlling the stroke of said head.

In witness whereof, I have hereunto set my hand this 27th day of April 1905.

CHARLES S. YARNELL.

Witnesses:

C. G. HANSON,

C. MACNAMARA.